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ABSTRACT

Administrators who have been trained in the sciences may be more effective than those who have been trained in the humanities, according to a review of the literature. This paper asserts that the effectiveness of superintendents is a function both of their specific preparation for administration and of their educational backgrounds. The superintendent's effectiveness can be assessed in the areas of planning, organizing, staffing, directing, coordinating, reporting, and budgeting. Scientific management techniques address these areas and may be best used by administrators with scientific training. Comments by numerous writers indicate that not only are the scientific aspects of management better handled by those with scientific training, but the humanistic aspects are better handled as well. A bibliography of 22 references completes the document. (PGD)

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Scientific Management:

PROFESSIONAL BACKGROUND IN SCIENCES, HUMANITIES, AND THE EFFECTIVENESS OF SCHOOL SUPERINTENDENTS

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SCIENTIFIC MANAGEMENT:

PROFESSIONAL BACKGROUND IN SCIENCES, HUMANITIES, AND THE EFFECTIVENESS OF SCHOOL SUPERINTENDENTS

INTRODUCTION

The school superintendents are the chief executive officers of the school districts and play a vital role in the education of the young people. Superintendents are responsible for the success of the educational programs and services under their supervision. Research and also the practices indicate that the education of the superintendents has a bearing on their effectiveness as a school superintendent. In terms of functional relationship, their effectiveness may be expressed as follows:

E = f (F, B), where

E = Effectiveness

F = Final Preparation for Superintendency

B = Background Preparation

Assuming that all the superintendents have completed the required courses for their certification, they all have training and knowledge of educational administration. This training for the purpose of this paper is called the "Final Preparation" for superintendency (F). Their earlier education may be in sciences or humanities. For the purpose of this paper, this education in science/mathematics or the humanities is termed "Background Preparation" (B). The final preparation of the superintendents in educational

administration as well as their background preparation in sciences/mathematics has an affect on the overall effctiveness of superintendents, but it is the affect of their background preparation in sciences or humanities, which is the concern of this paper.

* About forty seven percent (47.6%) of the superintendents taught science/mathematics in their full-time positions in education before becoming superintendent.[1]
* About twenty six percent (26.5%) of the superintendents had a major field of science/mathematics for their bachelor's degree program.[2]
* Three percent (3%) of superintendents had a major field of science/mathematics for their master's degree program.[3]

SIGNIFICANCE OF THIS STUDY

An interest in personnel matters gave the author the idea to study school superintendents' overall effectiveness based on their background in science/mathematics or humanities. Changes in personnel concerns should be based partially upon 'effectiveness'. This study should be of interest to educators, trustees, school boards, general public and the universities who train the superintendents. It should also be of further interest to people interested in the field of

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[1]S. Knezevich, American School Superintendent, (VA: American Association of School Administrators, 1971), p. 26.

[2]Krishan Chand, "Job Satisfaction of Superintendents in the United States" (Ed.D. Dissertation, New York University, 1982), p. 32.

[3]Ibid. p. 33.

sciences and humanities in particular. Superintendents are the chief school administrators and are responsible for the education of the students in the nation. They hold a highly visible position. Study of their effectiveness is thus of siginificance. Superintendents may make a difference in the educational improvement.[4] They perform a wide variety of tasks.[5]

EFFECTIVENESS OF SUPERINTENDENTS

An interest in efficiency has been a conscious concern of school administrators since the early 1900s.[6] An administrator's effectiveness is difficult to define and measure.[7] The author for the purpose of this paper defines and deduces this effectivess of superintendents from the following:

$$\text{Effectiveness} = \frac{\text{Output}}{\text{Input}} \quad \text{---------- 8}$$

[4]Krishan Chand Educational Improvement in the United States ERIC Document Reproduction Service, U.S. Department of Education, ED 268 629, 1984.

[5]Krishan Chand The Current Trend of the Job Description of School Superintendents in the United States ERIC Document Reproduction Service, U.S. Department of Education, ED 239 364, 1983.

[6]Raymond E. Callahan, Education and the Cult of Efficiency, Chicago: University of Chicago Press, 1962.

[7]Cecil G. Miskel, Principals' Perceived Effectiveness, Innovation Effort, and the School Situation, Educational Administration Quarterly, Vol. 13, No. 1, 1977, p. 31.

[8]Kristin J. Falk Exploring Concerns of Productivity in Education ERIC Document Reproduction Service, U.S. Department of Education, ED 126 567.

Function of Executives = P.O.S.D.C.R.B ------- 9

where P = Planning

O = Organizing

S = Staffing

D = Directing

C = Co-ordinating

R = Reporting

B = Budgeting

Evaluation of superintendents, is done by M.B.O. (Management by Objectives). ---------- 10

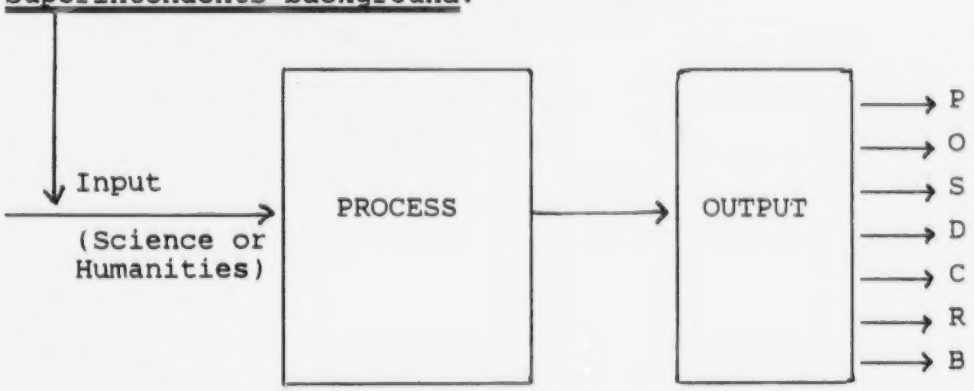
Hence the objective here is to have better effectiveness i.e. P.O.S.D.C.R.B.

Here in the case of superintendents:

Output = P.O.S.D.C.R.B.

Input = General aptitude i.e. background in science/mathematics or humanities. The effectiveness may thus be represented by the following diagram:

<u>Superintendents background</u>:



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[9]Luther Gulick, Notes on the Theory of Organization, Edited by: L. Urwick, <u>Papers on the Science of Administration</u>, Institute of Public Administration, N.Y. 1937, p. 13.

[10]George B. Redfern, <u>Evaluating the Superintendents</u> American Association of School Administrators & The National School Boards Association, Va. 1980.

A superintendent who has a better output (P.O.S.D.C.R.B.) will be said to be more effective. Output may be evaluated by the system approach of M.B.O. (Management by Objective), where one is evaluated based on the fact if the objective is met or not and to what extent.

DEFINITIONS OF SCIENCES AND HUMANITIES

A definition of science and humanities is tedious matter, and dictionary definitions are next to useless.[11] The author for the purpose of this paper considers the same as devisions of the empire of learnings into the sciences, and the humanities, as is a common practice to do so in many a schools and universities. Thus sciences includes physics, chemistry, biology, mathematics, etc., and humanities includes languages, literature, art, music, history, philosophy, etc.

YEARS OF SCHOOLING AFFECTS THE PERFORMANCE

All other factors being equal, it has been studied by several researchers that the level of education (years of schooling) has a positive effect on job effectiveness. Thus more the years of schooling, better the performance.

Griffin states, "the number of mathematics and science courses taken in high school ... may increase the student's work-related skills", he further states, "one semester of mathematics or science course work is worth .05 of a year of schooling. An 'average' student compared to a student with no formal coursework in either mathematics or

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[11]Moody E. Prior, Science and the Humanities Northwestern University Press, Evanston, 1962, p. 3.

science, would obtain almost a half-year more schooling."[12]

IMPORTANCE OF SCIENCE IN ADMINISTRATION

Price expressed his views concerning scientific background as follows:[13]

> "There are many issues on which it is not practical to look to operations research for the answers, but which cannot be handled properly without the kind of judgement that comes from scientific background. The Canadian government recognized this principle when it made its leading civilian scientist a member of its equivalent of the Joint Chiefs of Staff. The scientist should take part as a responsible administrator, right upto the highest levels, in making decisions that cannot be based entirely on objective research, and on which no responsible adviser can ever expect to be consulted."

Jones stated, "The humanities do not tell us anything: they are merely subjective, expressive, or emotive."[14]

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[12]Larry J. Griffin Social Background, Schooling, and Labor-market Experience: The Reproduction of Socio-Economic Inequality from Generation to Generation ERIC Document Reproduction Service, ED 142 716.

[13]Don K. Price Government and Science New York University Press, N.Y. 1954, p. 186.

[14]W.T. Jones The Science and the Humanities University of California Press, Berkeley and Los Angeles, 1965, p. 157.

Choike stated, "Mathematics is an important tool of the decision-makers and problem-solvers, and these are the people who successfully advance in their chosen careers."[15]

School administration is a science as well as an art. It is a science because the administrator has to follow the scientific procedures for an effective performance. It is an art because it is upon the administrator and his/her skills how to apply those skills. It is a well known fact, that the present age is a scientific age - a supersonic age. School administration has also become very scientific. Never before has there been the use and need of so many scientific methods in administration. The latest techniques e.g. PERT (Program Evaluation and Review Technique), PPBS (Planning, Programming and Budgeting System), ZBB (Zero Base Budgeting), M.B.O. (Management By Objective), Input, Output and feedback etc. are all very scientific and mathematical. All the superintendents practically now have to use these techniques for the successful administration of their school districts. The superintendents who have scientific background certainly becomes good and comfortable in useing these techniques, as compare to those of humanities. This helps them to be more effective.

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[15]James R. Choike, Mathematics at Work in Society: Opening Career Doors (Washington D.C.: The Mathematical Association of America, 1981), p. 3.

DUAL ROLE OF SUPERINTENDENTS

Superintendents have to play both the roles of scientists and the humanists. At one time a superintendent act as a scientist, and at other time a humanist.

During the present age of 'scientific management' most of the time, the superintendents have to be scientific. Further more, it is easier for the superintendents with background in sciences to act as 'humanists' whenever the need arises, than for the 'humanists' to act as 'scientist'. This is so, because every humanist and scientist is a human, but every human is not a scientist. Thus a background in sciences has an added advantage over humanists regarding administrative roles of a superintendent.

'SCIENTISTS' DO WELL

Pelz implies in his book "Scientists in Organizations", that scientists do well in many fields (other than their own), e.g. in Coordination (Chapter 12), Communication (Chapter 3), groups (Chapter 13), diversity (Chapter 4), creativity (Chapter 9), dedication (Chapter 5), motivation (Chapter 6), etc.[16]

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[16]Donald C. Pelz, Frank M. Andrews, Scientists in Organizations (New York: John Wiley and Sons), pp 1-318.

CRITICISM OF SCIENTISTS

During the selection of a university president, Waggoner said, 'only a scientist could possibly run the ball.'[17] President of the Enfield University, during the selection of the next president (after the retirement) remarked, "I'll say only thing: ... these scientists are good presidential timber. They make their marks early as scientists. Much earlier than the humanist or the social scientists usually does."[18] C.P. Snow in his book "The Masters" while appointing university 'Master' choses 'scientist' over the humanist for one reason: better performance. Several other cases have been written, showing that the scientists perform better on both the roles of scientists and humanists needed in administration, as compared to humanists.

Pelz says, "Scientists who are given a genuine share in the decision-making process -- and by this we mean not simply left alone to pursue whatever they like, but brought into genuine policy decisions- thereby become more involved in, and committed to, the technical goals that are being decided."[19]

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[17]Carlos Baker, A Friend in Power, Charles Scribner's Sone, N.Y. 1958, p. 89.

[18]Carlos Baker, A Friend in Power, p. 193.

[19]Donald C. Pelz, Frank M. Andrews, Scientists in Organizations, John Wiley and Sons, N.Y. 1966, p. 88.

Riesman says, "I have seen a number of colleges where anthropologists are more humanistic than the teacher of English, the physicists far more humanistic than the economists and sociologists."[20]

Weaver says, "The scientific priests themselves are wonderful but strange creatures. They admittedly possess mysterious mental abilities."[21] He further lists the following statements, which he believes to be more reasonable and accurate:[22]

(a) Science has impressively proved itself to be a powerful way of dealing with certain aspects of our experience. These are, in general, the logical and quantitative aspects, and the method works superbly for linear and stable physical problems in two or three variables.

(b) Science presents the kind of challenge that attracts to it young men and women who tend to have a rather high degree of a certain kind of intelligence.

(c) A.H. Hill, while he was President of the British Association for the Advancement of Science, stated: Most scientists are quite ordinary folk, with ordinary human virtues, weaknesses, and emotions.

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[20]David Riesman, The Academic Career: Notes on Recruitment and Colleagueship, Winter 1959, p. 156.

[21]Warren Weaver, Science and People, Science, Vol. 122, December 30, 1955), pp. 1255-1259, American Association for the Advancement of Science.

[22]Ibid.

The facts given in paras (a) and (b) above helps the superintendents with background in sciences to deal effectively with their duties and functions (P.O.S.D.C.R.B.) described earlier in this paper. The para (C) means that they will do better even for the instances where there is need to be more 'humanistic' on their humanistic roles.

Boas stated, "The scientists indeed enjoy great prestige and it must be admitted that they deserve it."[23]

The non-scientists have a rooted impression that the scientists are shallowly optimistic, unaware of man's conditions. They also tend to think of scientists as brash and boastful. Snow says, "Much of it rests on misinterpretations which are dangerous."[24]

Where there are humanistic concerns, like that of human relations on job, where humanistics feel, they would be more successful and effective, people with science background are usually not behind and they succeed because of their better analytic, organized, and systematic approach.

Rabinowitch states the following, concerning criticism of the scientists:[25]

The scientists is often represented as a narrow

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[23]George Boas, The Humanities and the Sciences, The Peabody Reflector, October 1956, p. 180.

[24]C.P. Snow, The Two Cultures and the Scientific Revolution, N.Y. 1959, pp. 4-6.

[25]Eugene Rabinowitch, "Science and the Humanities in Education," Bulletine of the American Association of University Professors, XLIV, 1958, p. 458.

specialist with little understanding and interest in literature and art, in history and social problems, and utterly naive and gullible in his political convictions and actions. This is the standard picture of the scientist, not only in comic strips or television plays, but also in literature, even when the author is as familiar with the scientific milieu as Mr. Andous Huxley should be by his family background. It is easy to point out that this picture is inapplicable to many scientists- in fact, to a large majority of them; that many- particularly the really outstanding ones- are very widely read; that the most abstract of them- the theoretical physicists- are, as a rule, highly musical (Planck invented a new musical instrument; Born, Heisenberg, Teller are accomplished pianists; and Einstein's violin is a familiar attribute). Even in the field of politics, scientists are not as naive as they are often supposed to be. When many of them propose radical solutions for the problems of our time, it is not because they are unfamiliar with the real state of affairs in the world and do not appreciate the difficulties of overcoming the traditional, ingrained prejudices and irrational passions which largely determine the behavior of men and nations, and of applying rational methods to the solution of human problems. They are well aware of these obstacles; but they are even more acutely aware of the consequences of not trying to over come them- a necessity which many nonscientists simply refuse to face.

In view of the aforesaid, personal and professional experiences and observations, the scientists appears to be better in solving such human problems related on their jobs. The superintendents thus seems to be in an advantage to use their science backgrounds towards tdheir administrative responsibilities.

Boas says, "The scientists are busy doing the devil's work, to the point of inventing weapons so destructive that, if they are used, the human race will be wiped out."[26] The scientists only gives the world their inventions, it is upto the human(ists) to use or misuse the inventions. While the natural scientists may destroy our bodies, the social scientists may destroy our souls. Such concerns are always raised by the humanists against the scientists. In case of scientist-superintendents such a question of 'destruction' can not be raised, because they don't invent such inventions on their job, but the case of humanistic-superintendents certainly arises here. The superintendents with a humanistic-background can certainly use their positions to destroy the souls of the young students and people working under them.

CRITICISM OF THE HUMANIST

Boas says, "the warfare between science and the humanities arises from the following causes:[27]

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[26]George Boas, The Humanities and the Science, The New Scientist, Edited by Paul C. Obler and Herman A. Estrin, New York, 1962, pp. 178-179.

[27]Ibid. p. 195.

(a) the ignorance which we humanists have of science

(b) our failure to see the implications for human living of scientific theories

(c) the tradition that there is a real division between life and art, life and science, life, in short, and the things for which and by which we live.

In view of what Boas just said in paras (a), (b), and (c), it is evident that the humanistics need to broaden their knowledge about the sciences, before they make any such a remark over the scientists and their performance on related areas.

Prior says, "humanists are sometimes narrow, pendantic, and uncultivated; and on the other hand scientists are often cultivated, humane, and sensitive."[28]

Such a statement also confirms that humanists should understand more about the scientists, and also that scientists being humane and sensitive may do better in human relations on job as needed by superintendents.

Further the humanists are not always good in human relations, and are also not always good for the citizens. Plato regarded the poets as a danger to his ideal commonwealth, and at least some theologians during the Middle Ages and the early Renaissance regarded secular literature with suspicion.[29]

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[28]Prior, Science and the Humanities, p. 5.

[29]Prior, Science and the Humanities, p. 45.

Holton says, "Among the signs of scientism are the habit of dividing all thought into two categories, upto-date scientific knowledge and nonsense."[30]

BEYOND THE SCOPE

To compare the effectiveness, it will be supportive to actually measure the effectiveness of superintendents with background in sciences and humanities, as per discussion given in this paper and then compare the same. But such an investigation requires time and money that is beyond the scope of this paper. Hence the same is not being done here.

CONCLUSION

Superintendents with background in sciences and in humanities, both have their strong points and areas in which they usually appears to be doing better. But most of the functions (P.O.S.D.C.R.B.) of superintendents are presently based on "Scientific Management". Hence in view of the facts stated in this paper, the overall effectiveness of superintendents with background in sciences appears to be more than those in humanities.

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[30]Gerald Holton, Modern Science and the Intellectual Tradition, Science, Vol. 131, April 22, 1960, pp. 1187-1193, American Association for the Advancement of Science.

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